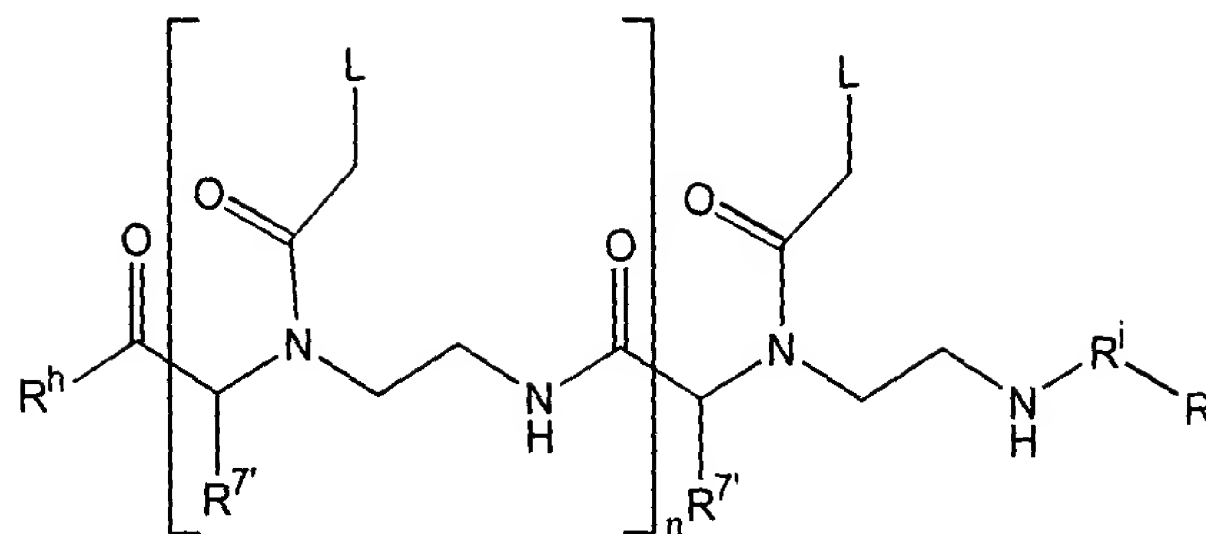


- $$\left[\begin{array}{c} \text{R}^h \\ \parallel \\ \text{C} \\ | \\ \text{N} \text{---} \text{CH}_2 \text{---} \text{CH}_2 \text{---} \text{NH} \text{---} \text{C} \text{---} \text{CH}(\text{R}^{7'}) \text{---} \text{N} \text{---} \text{CH}_2 \text{---} \text{CH}_2 \text{---} \text{NH} \text{---} \text{C} \text{---} \text{CH}(\text{R}^{7'}) \text{---} \text{N} \text{---} \text{CH}_2 \text{---} \text{CH}_2 \text{---} \text{NH} \text{---} \text{R}^i \text{---} \text{R} \\ \parallel \qquad \qquad \qquad \parallel \\ \text{O} \qquad \qquad \qquad \text{O} \end{array} \right]_n$$

24. A pharmaceutical composition comprising a composition comprising a peptide



wherein:

each L is, independently, a naturally-occurring nucleobase or a non-naturally-occurring nucleobase;

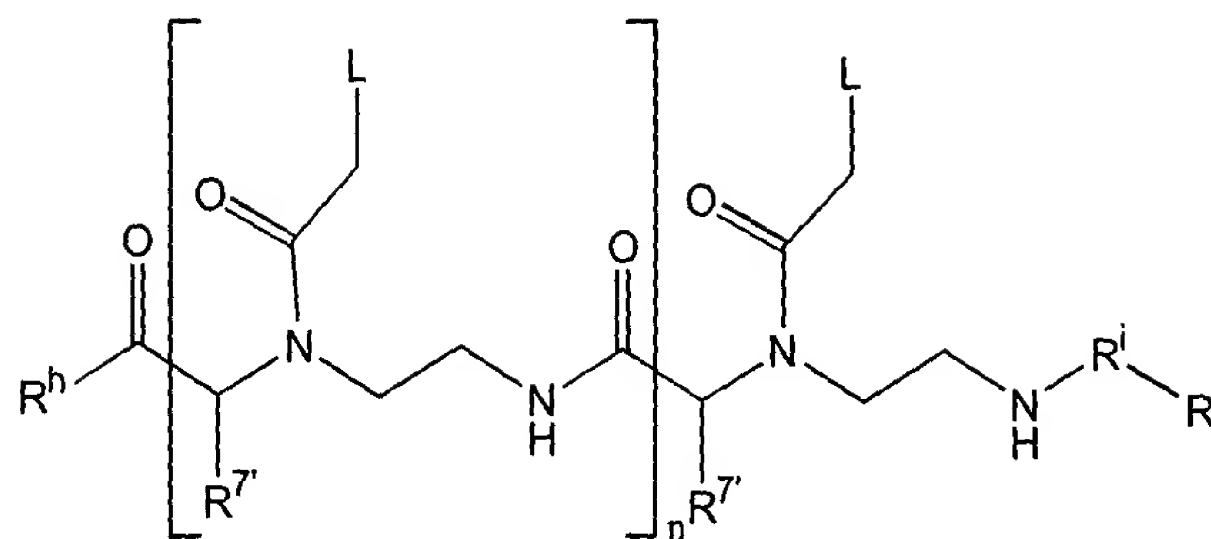
each R⁷ is hydrogen or the side chain of a naturally-occurring or non-naturally-occurring amino acid, at least one R⁷ being the side chain of a naturally-occurring or non-naturally-occurring amino acid;

R^h is OH, NH₂, or NHLysNH₂.

each of Rⁱ and R^j is, independently, a group selected from adamantoyl, alkyl, lipid, steroid, or an amino acid labeled with a fluorescent group; or Rⁱ and R^j, together, are a group selected from adamantoyl, alkyl, lipid, or steroid; and

n is an integer from 1 to 30.

32. A method of modulating cellular uptake and distribution of a peptide nucleic acid in a cell or tissue comprising administering to the cell or tissue a composition comprising a peptide nucleic acid incorporated into a liposome, said peptide nucleic acid having formula:



wherein:

each L is, independently, a naturally-occurring nucleobase or a non-naturally-occurring nucleobase;

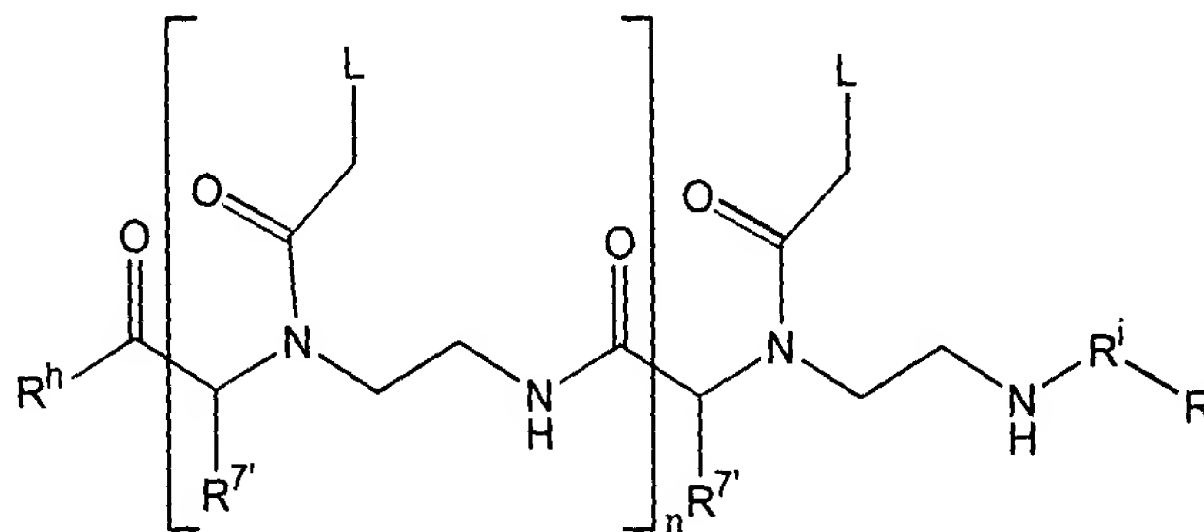
each R⁷ is hydrogen or the side chain of a naturally-occurring or non-naturally-occurring amino acid;

R^h is OH, NH₂, or NHLysNH₂;

each of Rⁱ and R^j is, independently, a group selected from adamantoyl, alkyl, lipid, steroid, or an amino acid labeled with a fluorescent group; or Rⁱ and R^j, together, are a group selected from adamantoyl, alkyl, lipid, or steroid; and

n is an integer from 1 to 30.

39. A method of treating an animal comprising administering to the animal a therapeutically effective amount of a peptide nucleic acid of formula:



wherein:

each L is, independently, a naturally-occurring nucleobase or a non-naturally-occurring nucleobase;

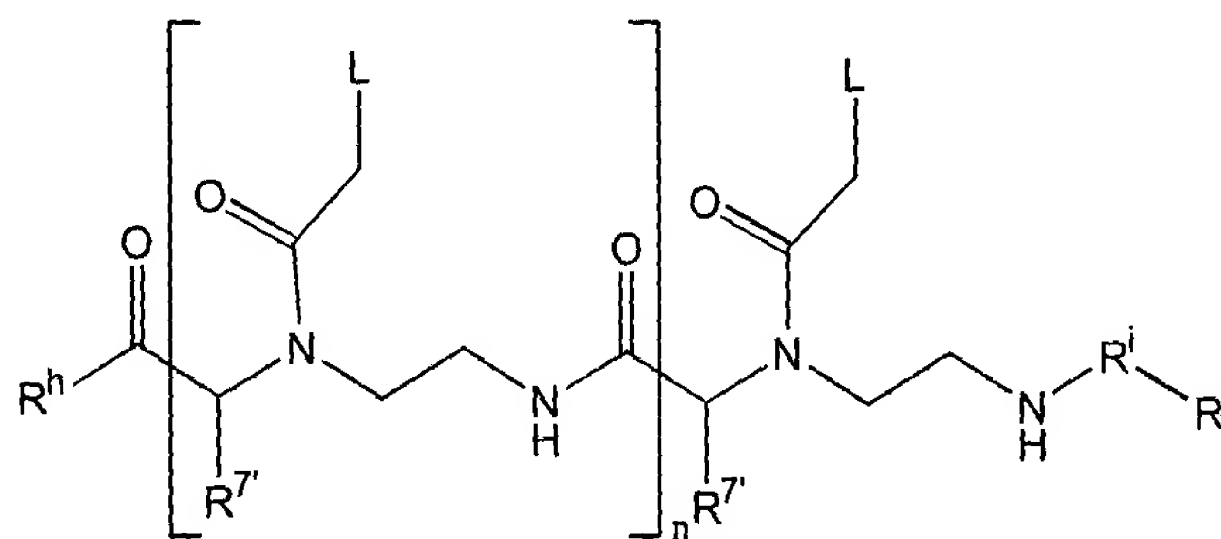
each R⁷ is hydrogen or the side chain of a naturally-occurring or non-naturally-occurring amino acid, at least one R⁷ being the side chain of a naturally-occurring or non-naturally-occurring amino acid;

R^h is OH, NH₂, or NHLysNH₂;

each of Rⁱ and R^j is, independently, a group selected from adamantoyl, alkyl, lipid, steroid, or an amino acid labeled with a fluorescent group; or Rⁱ and R^j, together, are a group selected from adamantoyl, alkyl, lipid, or steroid; and

n is an integer from 1 to 30.

46. A method of treating an animal comprising administering to the animal a therapeutically effective amount of a composition comprising a peptide nucleic acid incorporated into a liposome, said peptide nucleic acid having formula:



wherein:

each L is, independently, a naturally-occurring nucleobase or a non-naturally-occurring nucleobase;

each R⁷ is hydrogen or the side chain of a naturally-occurring or non-naturally-occurring